Practice Specification
Fence (Code 382)
Corral/Lot Fence Specifications

SCOPE

The work consists of constructing the fence, including any associated gates, water gaps and other related items as required by the construction plans or job sheets.

LOCATION

The location of the fence must be as shown on the plan map and as staked in the field.

SITE PREPARATION

Remove all trees, stumps, brush and debris from the fence construction site and dispose of properly so that they will not interfere with construction or proper functioning of the fence. Removed material must not be deposited or buried in a draw.

Remove and properly discard all broken fencing material and hardware. Take all necessary precautions to ensure the safety of construction and maintenance crews.

MATERIALS

Wooden Board Fence

Field Fence

Install fence materials on the stock side (inside) of the posts for the enclosure. Board fencesare usually wood or some type of composition board used for permanent fence for perimeter or subdivision purposes. Board fence is used primarily where aesthetics or animal safety is of concern. A wooden board fence must have a minimum of four boards. The maximum horizontal board spacing is 14-inches center to center. The top edge of the uppermost board must be at least 54 inches above the ground line, and the top edge of the lowest board no greater than 18 inches above the ground line.

Space posts a maximum of 8 feet on center to accommodate rail lengths.

Rails

The rails should be twice the post spacing, not to exceed 16 feet, with staggered seams on the posts. The rails must be a minimum size of 1” x 6” (nominal) and a minimum of 8 feet in length. Wooden boards (horizontal rails) must be well seasoned or kiln-dried to minimize warping. Use untreated durable wood of such species as red cedar, black locust, Osage orange or a non-durable wood that is preservative pressure treated. Treated lumber must be treated with a treatment from Table F. Boards may be painted if desired.

Each board must be attached to each post with a minimum of two 20 d. galvanized or cadmium coated nails. A continuous vertical 1” x 4” face board will be used at each line post to cover and help to secure the horizontal boards (rails) to the line post. They will be attached with four 4-inch long galvanized or cadmium, bronze or ceramic coated nails or decking screws. The nail holes for the rails will be predrilled where the ends of the boards butt together. For better holding power, use ring-shank, spiral, or screw-shank instead of common nails. Two 3-inch decking screws may be used instead of nails, if coated with Bronze or ceramic coating or stainless steel.

Posts

All bark must be removed from red cedar, Osage orange, and black locust posts. At least half the diameter of red cedar must be heartwood. Pressure treated pine or native wood of equal life and strength are acceptable. All posts will have a minimum top diameter of 6 inches and angular posts must have a minimum top, nominal dimension of 6 x 6 inches. The post will be of sufficient length to support the height of the fence and be firmly set or driven in the ground. Line posts will be set or driven a minimum of 36 inches. Gate and corner posts will be firmly set or driven in the ground a minimum of 48 inches. Posts must be treated with a preservative from Table F, with the exception for native wood such as black locust, Osage orange and red cedar. Posts may be painted if desired.

Plank (Corral) Fence

Install fence materials on the stock side (inside) of the posts for the enclosure. The fence must consist of five planks (2" x 6" nominal) spaced 6 inches apart with the bottom one near the ground line. Posts must be 6x6 treated material spaced at 8 feet apart and set minimum of 48 inches below ground line. The wooden posts and planks must be treated with a treatment from Table F. Quality of treated wood must provide sufficient strength and last for the expected life of the fence. The top board must be 54 inches above ground line. Each board must be attached to each post with a minimum of three 40 d. galvanized or cadmium coated nails or 4-inch long galvanized or cadmium, bronze or ceramic coated decking screws. Where two planks butt together, the nail holes will be predrilled to prevent the ends from splitting.

Other Fence Materials

Other materials such as guardrail, cable, and welded pipe, etc. may be used provided they have adequate strength and durability.

Used highway guard rails that are in good condition and galvanized or freshly painted are permissible.

Used steel cable (1/2 inch diameter minimum) that is not kinked, frayed or inflexible (no brittle or rust strands breaking when flexed at an acute angle) is permissible.

Used pipe such as 'drill stem' steel pipe (ASTM sch. 40, 2⅜-inch diameter) and used railroad ties or telephone poles may be used as posts if they are whole, sound, free from decay, have not been previously used as fence material, and so long as minimum diameter and length requirements are met for the type of fence to be constructed.

Galvanized panels that are straight and show no rust or bends may be used for construction. Fencing materials held between posts must be of material that will have a life expectancy of at least 20 years. Suitable material will include lumber, planed or rough cut (2 x 6 nominal inch minimum), wooden poles (6 inch diameter minimum), guard rails (IDOT highway quality), welded wire panels, and prefabricated commercial metal livestock panels. Horizontal spacing between fence materials must have a gap no greater than 16 inches. The bottom stringer will be no greater than 8 inches off the ground.

Commercial metal livestock panels should have at least one post set in the middle to prevent warping, or more if the panel is longer than 16 feet (see spacing requirements for line posts). Panels should lap over on the posts at the ends so that any pressure is passed to the post.

Fence material will be permanently affixed to the posts with welding or new, high-quality, durable hardware (i.e. bolts, clamps, turnbuckles, hinges, and latches) of adequate size to provide strength equal to the minimum requirements of the material. Bolts, or U-bolts, must have a minimum diameter of 5/16 inch. Bolts must extend completely through the material and post and be secured with washers and nuts on the non-stock side of the fence. It is preferred that hinges on metal gates be welded to posts if possible.

Splices for most fence materials will be accomplished by overlapping at a post and permanently affixing both pieces to the post.

In enclosures where large livestock are worked (i.e. branding, docking, doctoring, loading, etc.), a means of escape for people inside the enclosure to get over the fence must be provided. A continuous 'step' at least 3 inches wide and 2 feet from ground level will be affixed to the inside of the posts so that workers may jump over the fence to get out quickly if needed.

The ends of all fencing material and hardware must be completely smoothed on the stock side of the fence so that there are no sharp edges that could injure an animal or person.

Fence Wire and Fasteners

For smooth wire to be installed in conjunction with other fence materials, the wire must be at least 12½ gauge, single strand, minimum Hi-tensile strength of 140,000 PSI, and have 1,078 lbs. minimum breaking strength.

All wire must have, as a minimum, Class III galvanization.

Staples must be of 9-gauge Class III galvanized steel or heavier with a minimum length of 1½ inches for softwoods and a minimum length of 1 inch for close-grained hardwoods.

All hardware for cable fence must be of new galvanized material

For straight runs of 100 feet or less, only one 12-inch turnbuckle is required. Attach cable on opposite corner, looped through the eyebolt and fasten with not less than two cable clamp fasteners.

Posts and Stays

Wood posts must have a minimum nominal diameter of 6 inches inside the bark.

Schedule 40 galvanized steel pipe 2⅜–inch (OD) diameter, can be used for end, corner and braces posts, and follow standard drawings.

Steel pipe must be primed and painted as an alternative to galvanizing.

Install covers on the tops of metal pipe posts to prevent water from entering inside.

Length of posts must be as needed for the height of the fence plus the required depth in the soil.

Depth of line posts must be a minimum of 3 feet deep.

Spacing between posts for poles, lumber, guardrails, steel pipe, cables or steel panels must be no greater than 8 feet. Set brace posts every 200 feet and at any sharp angles. Posts must conform to the size and material specifications in Table E, except as noted below.

The top of all wooden posts must be 2 to 4 inches above the top rail of the fence to prevent splitting when attaching insulators.

All posts of materials other than wood must be at least 1-inch higher than the top rail of the fence.

Reinforced concrete or metal pipe posts of equivalent strength to the wood posts specified for corner, gate, end or pull assemblies, and brace posts may be substituted if a suitable means of attaching wires and braces to the posts is available.

Live trees may be allowed for bracing or line posts only when application of standard wooden posts or steel posts is impractical because of restrictive soil depths due to parent material (rock, shale, etc.) and cannot be set or driven to the minimum depths required by the standard and specification. At no time may live trees constitute more than 10 percent of line posts used.

Live trees used for bracing and line posts must have a diameter breast height (DBH) equal to or greater than those prescribed for normal wooden posts.

Use of landscape timbers is prohibited in any part of a fence.

CONSTRUCTION

Fence Material Placement

Fence height is defined as the average height from ground to top of the fence material at each fence post. Fence height of exterior/property line fences must be at least 54 inches unless law allows a lower height. In no case may the height of the exterior/property line fence be lower than 48 inches.

Fence height of interior fences must be at least 42 inches. All fence materials must be placed on the side of the post located closest to the livestock. Place fence materials on the outside of a curve or corner in the fence when required for structural stability.

Join wires using approved splices such as “Western-Union Splice,” square knot, or lap splice with three crimping sleeves or equivalent. “Figure eight knots” may be used for joining of Hi-Tensile wires**.**

Post Placement

In undulating terrain, space posts and stays so that fence height is maintained. Posts in depressions must be constructed so that they will not pull out of the soil. Wooden posts must be set to three feet and tamped with CA-6 or driven.

Set or drive posts to the depth as specified on plans or as outlined for the type of post in Table E.

Backfill around posts must be earth or Illinois Department of Transportation Gradation No. CA-6 coarse aggregate. Place the backfill in layers no thicker than 4 inches, each layer must be thoroughly tamped, and the posthole must be completely filled up to the ground surface.

Spacing of line posts and stays for permanent non-electric fence is dependent on type of fence.

Corners and Braces

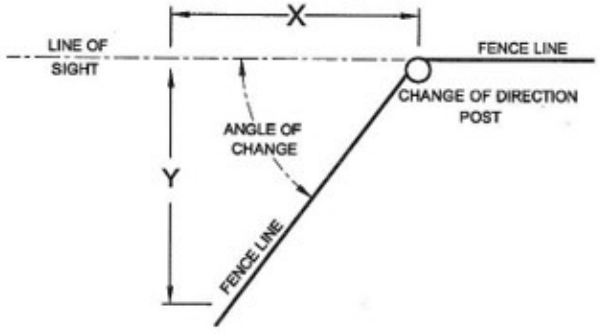
Bracing is required at all corner, gate, pull, and end assemblies in a fence. Notching of treated wood posts to retain wires or braces is prohibited in any part of a fence and is discouraged on native wood posts. The horizontal brace member must (as a minimum) be the equivalent of a 4-inch diameter post or standard weight (schedule 40) galvanized steel pipe of at least 2⅜-inch outside diameter installed in the upper 1/3 of the posts and below the top wire/rail. Steel pipe may be primed and painted as an alternative to galvanizing. The horizontal brace member length must be between 8 foot and 2.5 times the height of the top fence wire. At a minimum 3/8-inch diameter, Class I, Class II or Class III galvanized pins will be used to hold horizontal brace in place. A tension member (brace wire) composed of two complete loops of Class III galvanized 9-gauge smooth wire or Class III galvanized 12½-gauge Hi-Tensile strength smooth wire may be used. “H” Braces, Double “H” Braces, or Angle Braces must be used in standard fences. Refer to applicable IL NRCS Fence standard drawings for specifications on corners, angles, or brace assemblies.

End bracing will be installed at locations where the fence ends and on both sides of gate openings when gate is located inline.

Changes in fence directions greater than 20 degrees, but less than 60 degrees require change of direction bracing as shown in standard drawing, IL ENG-823.

The diagram below illustrates the angle of change concept and provides a table that can be used to determine / plan angles of change. Example: measure along fence line (X) 10 feet from post where direction changes, then measure out to fence line (Y). If distance to Y is 4 ft., then according to Figure 1, change of direction is slightly over 20 degrees.

Figure 1 Estimating Fence Line Angle of Change



FOR X = 10 FEET	
Y	ANGLE
1 FT. 9 IN.	10°
3 FT. 8 IN.	20°
5 FT. 9 IN.	30°
8 FT. 5 IN.	40°
11 FT. 11 IN.	50°
17 FT. 4 IN.	60°

Changes in fence directions from 60 to 90 degrees require a standard corner brace assembly. Tie off all wires at corner posts.

Do not pull wire around corner posts.

Driven series of single posts should be used on a maximum of 10-foot centers when rounding a long, gradual fence curve greater than 20 degrees. Driven single posts must have a minimum diameter of 6 inches and be driven at least 4 feet into the ground with a 4 inch lean toward the outside of the curve.

On sandy loams and coarser textured soils, or sites with restricted soil depth of less than 36 inches, “dead-man,” a screw-in anchor applied against the direction of pull, or a double “H” assembly is required.

Dug brace assemblies that are supporting gates must have an additional brace wire to support the gate, resulting in brace wires making an “X.”

A single 7-inch minimum diameter driven post may be substituted for a single “H“ assembly end panel, corner, vertical change bracing, and pull post assembly. The post must be driven a minimum of 5 feet into the ground.

Used red cedar, black locust and Osage orange can be used as long as the posts are whole, sound and free of decay (as good as new) and one inch larger in diameter than designated in Table E.

Gates and Water Gaps

Lumber gates must be constructed of 2 inch or larger dimensional lumber. Metal gates must be constructed of 1½ inch or larger galvanized steel pipe.

Commercial gates must be constructed of good quality and durable material and installed in accordance with the manufacture’s recommendations. Commercial gates must have a life expectancy equal to the rest of the fencing material (20 years minimum) on hinged gates, set hinge pins to hold gate in place so gate cannot be lifted off pins. When using gates of substantial weight, provide support to the free end of gates, when open or closed, to relieve constant pressure applied to post on hinged end of gate.

UTILITIES

The landowner and/or contractor is responsible for locating all buried utilities in the project area, including drainage tile and other structural measures

Prior to all digging and soil disturbance landowner and/or contractor will call JULIE.

SAFETY

Consider all safety recommendations and cautions from suppliers, distributors, manufacturers, installers, dealers, power companies, electricians, and other professionals, when constructing fences.Remove and properly discard all broken fencing materials and hardware. Take all necessary precautions to ensure the safety of construction and maintenance crews.

TABLE E: Acceptable post materials and installation depths for non-electrified fence

Function	Material Type	Minimum Diameter in Inches	Notes
Line Posts and Stays (All Posts must be set or driven at least 24 inches in the ground.) (See note for depth of T posts)	Black locust, red cedar or redwood. [1,2]	3	At least one-half of the diameter of the red cedar or redwood post must be heartwood.
	Osage orange. [1,2]	2 1/2	
	Pressure-treated pine or other wood of equal life and strength.	3	Pressure treatment must be according to Table F.
	Standard “T,” “Y,” or “U” shaped steel posts (hot dip galvanized, painted with high-grade weather resistant steel paint, or enameled and baked).	*	*** Weight must be at least 1.33 pounds per foot of length with the weight of the anchor plate.** Posts must be new. Posts must be set solidly in the ground so that the top of the anchor plate is below the ground surface.

Function	Material Type	Minimum Diameter in Inches	Notes
Wood posts for corners, gates, end or pull assemblies, and brace post assemblies.	Wood posts, including black locust, red cedar, redwood, Osage orange, or pressure-treated pine or other wood of equal life and strength, with appropriate knee, dead-man, angle, or "H" brace. [1,2]	6	At least one-half of the diameter of the red cedar or redwood post must be heartwood. Pressure treatment must be according to Table F. Posts must be set at least 36 inches deep or below the frost line.

[1]At least one-half of the diameter of the red cedar or redwood post must be heartwood. Pressure treatment must be according to Table E.

[2]Used red cedar, black locust and Osage orange can be used as long as the posts are whole, sound and free of decay (as good as new) and one inch larger in diameter than designated in Table E.

TABLE F: Allowable pressure treatment for wood posts. Pressure treatment must conform to American Wood Preservers Association (AWPA) Standard U1, Use Category 4 (UC4) or higher

Treatment Type	Pressure Treatment Level
Pentachlorophenol (PCP)	UC4 = 0.4 lbs/ft^3
Creosote and creosote solutions	UC4 = 6.0 – 8.0 lbs/ft^3
Chromated Copper Arsenate (CCA)	UC4 = 0.4 lbs/ft^3
Alkaline Copper Quat (ACQ)	0.4 lbs/ft^3
Micronized Copper Quaternary (MCQ)	UC4 = 0.34 lbs/ft^3
Micronized Copper Azole (MCA)	UC4 = 0.15 lbs/ft^3
Micronized Copper Azole (MCA)	UC4=0.06 lbs/ft^3 - (D)

UC4 = A – Ground contact or fresh water.

B – Ground contact, fresh water or important construction components.

C – Ground contact, fresh water or critical structural components.

D – Agricultural and Residential Uses and above ground only.

Specific Site Requirements

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